IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

CISCO SYSTEMS, INC. and ACACIA COMMUNICATIONS, INC., Plaintiffs, v. RAMOT AT TEL AVIV UNIVERSITY LTD., Defendant.	)	C. A. No. 21-1365 (GBW)
CISCO SYSTEMS, INC. and ACACIA COMMUNICATIONS, INC., Plaintiffs, v. RAMOT AT TEL AVIV UNIVERSITY LTD., Defendant.	)	C. A. No. 22-674 (GBW) (CONSOLIDATED)

PLAINTIFFS' COMMENTS ON RAMOT'S TECHNOLOGY TUTORIAL

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Pursuant to Paragraph 7 of the Court's Revised Scheduling Order (D.I. 103), Plaintiffs Cisco Systems, Inc. and Acacia Communications, Inc. (collectively, "Cisco") submit the following comments on the Technology Tutorial submitted by Defendant Ramot at Tel Aviv University Ltd. ("Ramot") regarding U.S. Patent Nos. 11,133,872 ("the '872 patent") and 11,342,998 (the '998 patent") (collectively, the "Asserted Patents") (*see* D.I. 114, 115).[1]

At a high level, Ramot's Technology Tutorial does not appear to be inconsistent with Cisco's Technology Tutorial but in places detours into technology—as noted in Cisco's comments below—that is not relevant to the claims at issue in the present Action. Cisco's tutorial focused on explaining differences between (i) modulators that are driven with an analog drive signal from a digital-to-analog converter (DAC) and (ii) digital modulators that are driven with digital drive signals without the use of a DAC. Ramot's tutorial is largely silent on this distinction that is at the heart of the disputed issues in this case.

Cisco provides comments directed to specific portions of Ramot's Tutorial below.

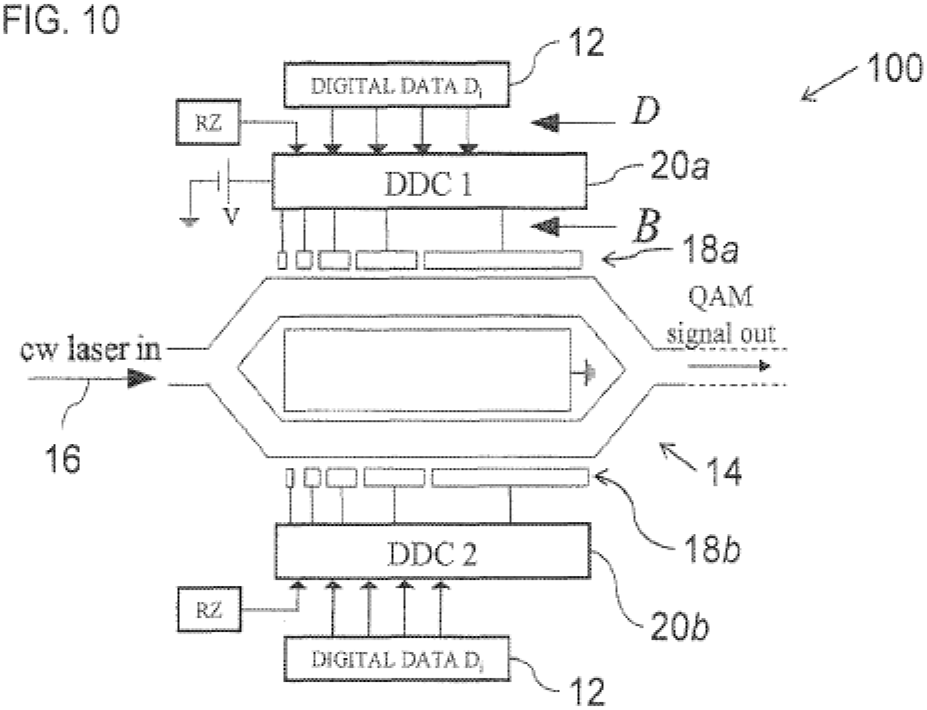
First, Ramot's Technology Tutorial, starting at around 5:50 and spanning slides 11-16, emphasizes several concepts—such as different modulation schemes (PAM-4, QPSK, QAM) and data formats (return-to-zero vs. non-return to zero (NRZ))—that have little relevance to the claims at issue in the present action.

Second, on slide 16, starting around 8:19, Ramot's Tutorial begins a discussion of "multi-level modulation schemes" such as PAM-4 and 64-QAM. Ramot then transitions to slide 17, and states, "The patents define this choosing of multiple 'values represented by different levels within a range of values of an essentially continuously variable parameter' as an 'analog' form of data." It is not clear what Ramot means by "choosing of multiple values". As reflected at the citation,

[1] Unless otherwise noted, all docket citations are to C.A. No. 21-1365.

the patents state that "'analog' refers to a form of data in which values are represented by different levels within a range of values of an essentially continuously variable parameter." Ramot Tutorial at slide 17 (citing '872 Patent, 4:53-62). To the extent Ramot's Tutorial is suggesting that "multi-level modulation schemes" are synonymous with analog drive techniques and analog signal driven modulators, Cisco disagrees. As reflected in Cisco's Technology Tutorial, optical modulators may be driven with an analog drive signal provided from a digital-to-analog converter (DAC) or digitally driven to provide the same modulated optical output. As explained in Cisco's Tutorial, the electrode structure will differ depending on whether the modulator (for example a Mach Zehnder Interferometer modulator) is driven with an analog signal (from a DAC) or by a multi-bit digital drive signal. By way of example, the Asserted Patents show an example of a digitally driven, multi-level (16-QAM) modulator in FIG. 10:

FIG. 10



’872 Patent, 6:43-45 (“FIG. 10 is a schematic representation of a modulator device, similar to the device of FIG. 1, implemented as a 16-QAM modulator”). Indeed, each of the different basic types of modulators disclosed in the Asserted Patents (Mach-Zehnder Interferometer (MZI) modulator (FIGS. 1 and 10), Electro-Absorption Modulator (FIG. 8), and semiconductor laser modulator (FIG. 9)) and shown in Ramot’s Technology Tutorial at slide 24 (starting around 11:41) may be driven with an analog drive signal (from a DAC) or be driven digitally, but the electrode structure would differ depending on the drive technique and, of course, if driven with an analog signal, a DAC would be required. Each embodiment shown on slide 24 of Ramot’s Tutorial uses the segmented electrode structure discussed in Cisco’s Tutorial and is driven digitally, directly by the digital output of the Digital-to-Digital Converter (DDC) (or by digital data in case of the semiconductor laser embodiment of FIG. 9). *See* ’872 Patent, FIGS. 1, 8, 9, 10, 7:13-17 (describing modulator of FIG. 1), 13:13-22 (describing modulator of FIG. 8), 13:42-65 (describing modulator of FIG. 9), 14:22-41 (describing modulator of FIG. 10).

Finally, on slide 21, starting around 10:17, Ramot’s Tutorial shows the DDC (Digital-to-Digital Converter) mapping of FIG. 4 displayed adjacent to the modulator embodiment of FIG. 1 of the ’998 Patent. FIG. 4 shows a mapping of 4 digital input bits to a 4-bit digital output drive vector. However, the embodiment of FIG. 1 has 5 drive electrodes coupled to the first branch of the modulator. As such, the DDC 20 of the embodiment of FIG. 1 maps the 4-bit digital input (D) to a 5-bit digital output drive signal (B). Because of this different structure, the mapping reflected in the table of FIG. 4 would not be used with the embodiment of FIG. 1. *See* ’872 Patent, 7:64-8-9 (describing table of FIG. 4 used with an N=M=4 embodiment), FIG. 1 (showing 4-bit digital input B and 5-bit digital drive output (D) provided to 5 electrodes 18).

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CERTIFICATE OF SERVICE

I hereby certify that on July 25, 2024, I caused the foregoing to be electronically filed with the Clerk of the Court using CM/ECF, which will send notification of such filing to all registered participants.

I further certify that I caused copies of the foregoing document to be served on July 25, 2024, upon the following in the manner indicated:

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